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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/904,839	07/16/2001	Shigeki Tanaka	501.35250CX3	2815
20457	7590	02/03/2004	EXAMINER	
ANTONELLI, TERRY, STOUT & KRAUS, LLP 1300 NORTH SEVENTEENTH STREET SUITE 1800 ARLINGTON, VA 22209-9889			FARAHANI, DANA	
			ART UNIT	PAPER NUMBER
			2814	

DATE MAILED: 02/03/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/904,839

Applicant(s)

TANAKA ET AL.

Examiner

Dana Farahani

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 November 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. §§ 119 and 120

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.
a) ☐ The translation of the foreign language provisional application has been received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). _____
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____ 6) ☐ Other: _____

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-5, 7-10, and 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa et al., hereinafter Ishikawa (US Patent 5,907,190) in view of the Japanese patent 59105349 (Document ID#), issued to Mori et al., and further in view of Eytcheson (US Patent 5,072,281).

Regarding claims 1, 7, and 12, Ishikawa discloses in figure 1 a semiconductor device, shown in the figure, comprising a substrate 1; a semiconductor chip 2 mounted on one surface of the substrate and having bonding pads 3; a plurality of conductors 5 surrounding the chip; bonding wires 4 electrically connecting the bonding pads 3 with conductors 5; and a resin body 7 sealing the chip, the conductors, and the wires.

Ishikawa does not disclose a pitch between adjacent bonding pads increases in a direction toward four corners defined by the four sides of the main surface of the chip. Furthermore, Ishikawa does not expressly disclose the chip has a quadrilateral shape and wires along the four sides.

The Japanese patent discloses in figures 1 and 3, a quadrilateral shaped chip, "a" of figure 1, and wires along its four sides; and the pitch between adjacent bonding pads d1-d13 of figure 3 increases in a direction toward four corners defined by the four sides of the main surface of chip

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a. The Japanese patent also discloses such arrangement enables each wire interval becoming constant (see the abstract, last paragraph). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to increase the pitch between bond pads toward the corner of the chip in Ishikawa's invention in order to have constant wire (conductor) intervals.

The Japanese patent, or the Ishikawa reference, does not disclose an extension of the one respective end of at least one of the plurality of conductors extends diagonally through a corner of the chip.

Eytcheson discloses in figure 2, extension of conductive leads 14 extends diagonally through a corner of chip 10, as shown in the figure. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to make one of the conductors of the Ishikawa in view of the Japanese patent device to extend diagonally through a corner of the chip therein in order to have greater flexibility in accessing the individual circuitry components on the chip.

Regarding claims 2 and 3, the Japanese patent discloses in the last paragraph of the abstract that based on an optimum value, which is determined by successive approximation with a computer, the increasing intervals are determined. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to determine the pitch (increasing intervals) in order to have more exact constant wire intervals.

Regarding claims 4, 8, and 13, see Ishikawa, column 4, lines 9-11, wherein it is stated filler 8 is heat distortable.

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Regarding claims 5, 9, 10, 14, and 15, Ishikawa does not expressly disclose insulating layer on the surface of the substrate. It is well known in the art to form an insulating layer (glue) on the substrate and beneath the chip on the substrate. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use insulating glue on the substrate to bond the chip, and the corresponding conductive elements, on the substrate, since it is normally used as a bond means between the chip and the substrate.

3. Claims 6, 11, and 16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ishikawa in view of the Japanese patent and Eytcheson, as applied to claim 1 above, and further in view of Irwin et al., hereinafter Irwin (U.S. Patent 5,627,850).

Ishikawa in view of the Japanese patent and Eytcheson renders obvious the claimed invention, as discussed above, except for copper being used for the conductors (wires). Irwin teaches that copper is a good thermal and electrical conductor with an advantageously direct bond property. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use copper for the conductors, since copper is a good electrical and conductor.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dana Farahani whose telephone number is (571)272-1706. The examiner can normally be reached on M-F 8:00AM - 6:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (703)306-2794. The fax phone numbers for the

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organization where this application or proceeding is assigned are (703)872-9306 for regular communications and (703)872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703)308-0956.

D. Farahani



LONG BEACH
PRIMARY EXAMINER